Physikalisches Kolloquium

Universität Konstanz

Di 31.01.23
15:15 Uhr
R 513
im Anschluss Getränke und Snacks

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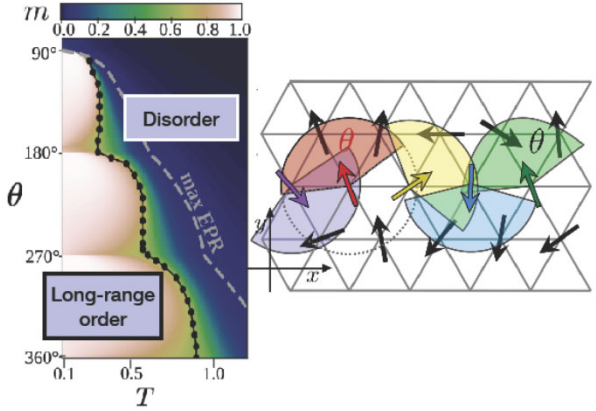

The role of non-reciprocal interactions in nonequilibrium systems

The world surrounding us mostly operates far from thermal equilibrium, including all living and various artificial systems. The fields of active matter and stochastic thermodynamics have made great progress in unravelling the fundamental principles that govern the individual and collective dynamics of nonequilibrium systems. However, one important feature that is ubiquitous in biology, chemistry, and engineering has received rather little attention; namely the presence of non-reciprocal interactions, i.e., interactions that violate Newton's third law.

In this talk, I will first discuss the general thermodynamic implications of non-reciprocal interactions between single particles subject to thermal noise [1,2]. I will also discuss time-delayed interactions [4] as a special type of non-reciprocal interactions. By considering a classical XY spin model [3] and a (Vicsek-)model for the swarming of insects [5], I will further provide perspectives on how non-reciprocal interactions affect the collective behaviour of many-body systems.

[1] Loos and Klapp, NJP 22, 123051 (2020)
[2] Loos, Arabha, Rajabpour, Hassanali, Roldan, ArXiv :2211.05502 (2022)
[3] Loos, Klapp, Martynec, ArXiv:2206.10519 (2022)
[4] Loos and Klapp, Sci. Rep. 9, 2491 (2019)
[5] Holubec, Geiss, Loos, Kroy, and Cichos, PRL 127, 258001 (2021)

Host: Prof. Bechinger

Organisation: Prof. Bechinger